

birefringent foil having a tilted optical director profile.

7. (original) A head-mounted display comprising a liquid crystalline image display panel, an optical system for imaging an image in an observer's eye, and head-supporting means, characterized in that the liquid crystalline display panel is implemented as the image display panel in the image projection system as claimed in claim 1.

8. (original) A liquid crystalline image display panel for use in an image projection system, comprising a layer of TN (twisted nematic) liquid crystalline material which is enclosed between a first and a second polarizer, characterized in that the liquid crystalline image display panel is implemented as claimed in claim 1.

REMARKS/DISCUSSION OF ISSUES

Claims 1-5, 7 and 8 are pending in the application.

Applicant thanks the Examiner for acknowledging the claim for priority and receipt of certified copies of all the priority documents.

The drawings are objected because of the way Fig. 2b shows the angle ϕ between arrows 29 and 41, whereas the direction of 35 would be vertically down in the plane of the page (negative y-direction), putting the angle below the x axis, not above it.

In Applicant's prior response, it was pointed out that reference numeral 35 in Fig. 2(a) indicates the inactive rubbing direction, which is not relevant to the determination of angle ϕ . Rather, angle ϕ is determined by the active rubbing

direction, indicated by arrow 29, and the projection of the director (arrow 37 in Fig. 2(a)) onto the x-y plane, depicted by arrow 41. Thus, Fig. 2(b) is correct.

Nevertheless, the Examiner has repeated the objection, referring to page 7, lines 30-32 of the specification, which states:

$\phi=5^\circ$ means that the projection of the optical axis (**the optical axis lies in the x-z plane, page 6, lines 29-30**) of the element (**birefringence-compensating element, Fig. 1**) in the plane of the polarizer (**x-y plane, Fig. 2a**) is rotated 5° in the direction of the projection of the mid-plane director (**the mid-plane director is the average direction in which the molecules are twisted in the liquid crystalline layer, page 7, lines 24, 25**), in the plane of the polarizer, with respect to the active rubbing direction (**arrow 29, Figs. 2(a), 2(b)**). (material in bold added).

Thus, the above passage referenced by the Examiner makes clear that the inactive rubbing direction (arrow 35 in Fig. 2(a)) is not relevant to the determination of angle ϕ , and that Fig. 2(b) is indeed correct in its present form.

Accordingly, it is urged that the objection to the drawings be withdrawn.

Claims 1, 3, 4, 7 and 8 are rejected under 35 USC 103(a) as being unpatentable over Xu in view of Abileah et al.

Applicant acknowledges that Xu discloses an embodiment in which only one compensation element (retarder) is employed, i.e., Fig. 14. However, Xu defines the angle of his retarder 31 in terms of the angle θ , not the angle ϕ .

These angles are defined by Xu in the conventional manner, which is also the manner in which they are defined by Applicant. Thus, the angle θ is defined as the tilt angle of the optical axis of the retarder with the normal (z axis). See col. 6, lines 60-66, and figs. 14 and 16. Compare figure 2(a)

of Applicant, where the angle θ is defined by the direction of the director 37 and the normal 39 (z axis).

Xu defines the angle ϕ as the angle between the projection of the viewing angle in the x-y plane and the x axis (see Fig. 16), while Applicant defines the angle ϕ as the angle between the projection of the director in the x-y plane and the x axis which corresponds to the active rubbing direction (see Fig. 2(b)).

In teaching a tilt angle θ instead of ϕ , Xu provides no guidance to the skilled artisan which would enable the realization of, and actually teaches away from, an image projection system as claimed by Applicant.

The Examiner acknowledges that Xu does not teach a tilt angle ϕ , but states that since the active rubbing direction could be either of two rubbing directions at 90° to each other, the angle ϕ must inherently be different from 0 with respect to one of them, so the limitation is met.

However, there is no inherent reason why there should be any angle between the active rubbing direction and projection of the director in the x-y plane. It is only with the hindsight gained from Applicant's own teachings that there should be an angle between the active rubbing direction and projection of the director in the x-y plane, and such hindsight is not permitted in judging obviousness under Section 103.

Next, the Examiner urges that Abileah et al teach rotating the optical axis by an angle θ , most preferably by an angle of about $6-10^\circ$, citing col. 9, line 39 through col. 10, line 4.

However, as pointed out in Applicant's prior response, in Abileah et al., the optical axis (represented by double arrow R, which lies in the x-y plane (col. 9, line 33)) is rotated in

the x-y plane with respect to a direction Ro. This is different from Applicant's invention wherein the optical axis (as represented, e.g., by arrow 37 in fig. 2(a)) is tilted and thus does **not** lie in the x-y plane. In Applicant's invention, what lies in the x-y plane is only a **projection** of the tilted optical axis (represented by 41 in fig. 2(b)).

Thus, Abileah et al. do not teach or suggest Applicant's invention.

Accordingly, it is urged that the rejection is in error and should be withdrawn.

Claims 1-5, 7 and 8 are rejected under 35 USC 103(a) as being unpatentable over Kawata et al. in view of Abileah et al.

It is acknowledges that Kawata et al. discloses an embodiment including a single optical compensation sheet RF1. However, Kawata et al. define the tilt angle in the same manner as does Xu, i.e., the angle between the optical axis and the normal (see col. 17, lines 24, 25), not the angle between a **projection** of the tilted optical axis in the x-y plane and the active rubbing direction.

Thus, Kawata et al. also teaches away from Applicant's claimed invention. Abileah et al. cannot supply the teachings missing from Kawata et al. for the reasons already stated above.

Accordingly, it is urged that the rejection is in error and should be withdrawn.

In view of the foregoing, Applicants respectfully request that the Examiner withdraw the rejection of record, allow all the pending claims, and find the application to be in condition for allowance. If any points remain in issue that may best be resolved through a personal or telephonic interview, the

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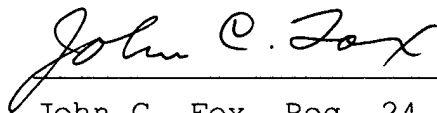
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Amendment/Response

Reply to FINAL Office action of 6 February 2003

Examiner is respectfully requested to contact the undersigned
at the telephone number listed below.

Respectfully submitted,

A handwritten signature in cursive script that reads "John C. Fox". The signature is written in dark ink and is positioned above a horizontal line.

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